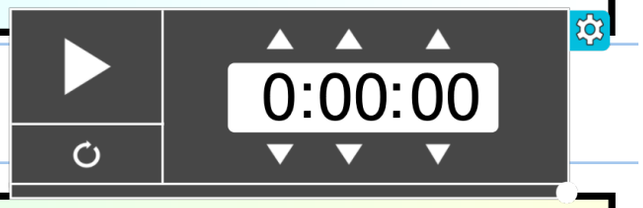
(6) M - Define thinking braking and stopping distance
(7) S - Explain factors that affect these distances
(8) C - Apply SUVAT to problems involving braking distance



Braking and stopping

Mini practical

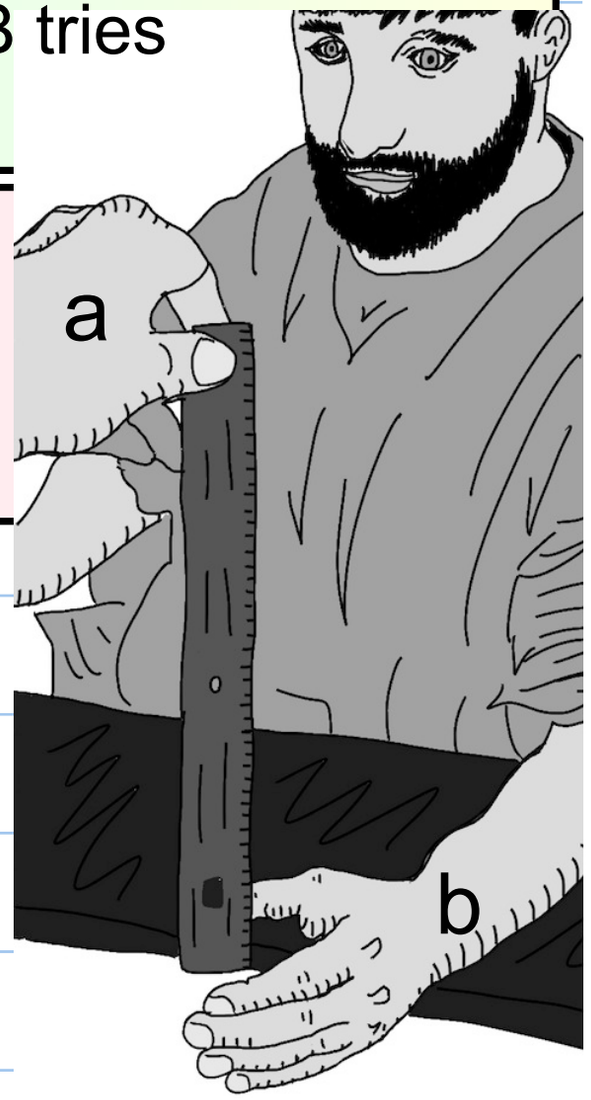
In pairs, person A drops a ruler. person B tries to catch it.

Record the mean distance it travels.

Calculate your mean reaction time.

Hint: use the SUVAT approach, and show working

Extension: If your reaction time was halved, what distance would have travelled?



(6) M - Define thinking braking and stopping distance
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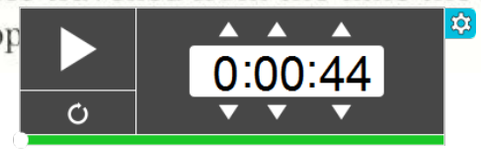
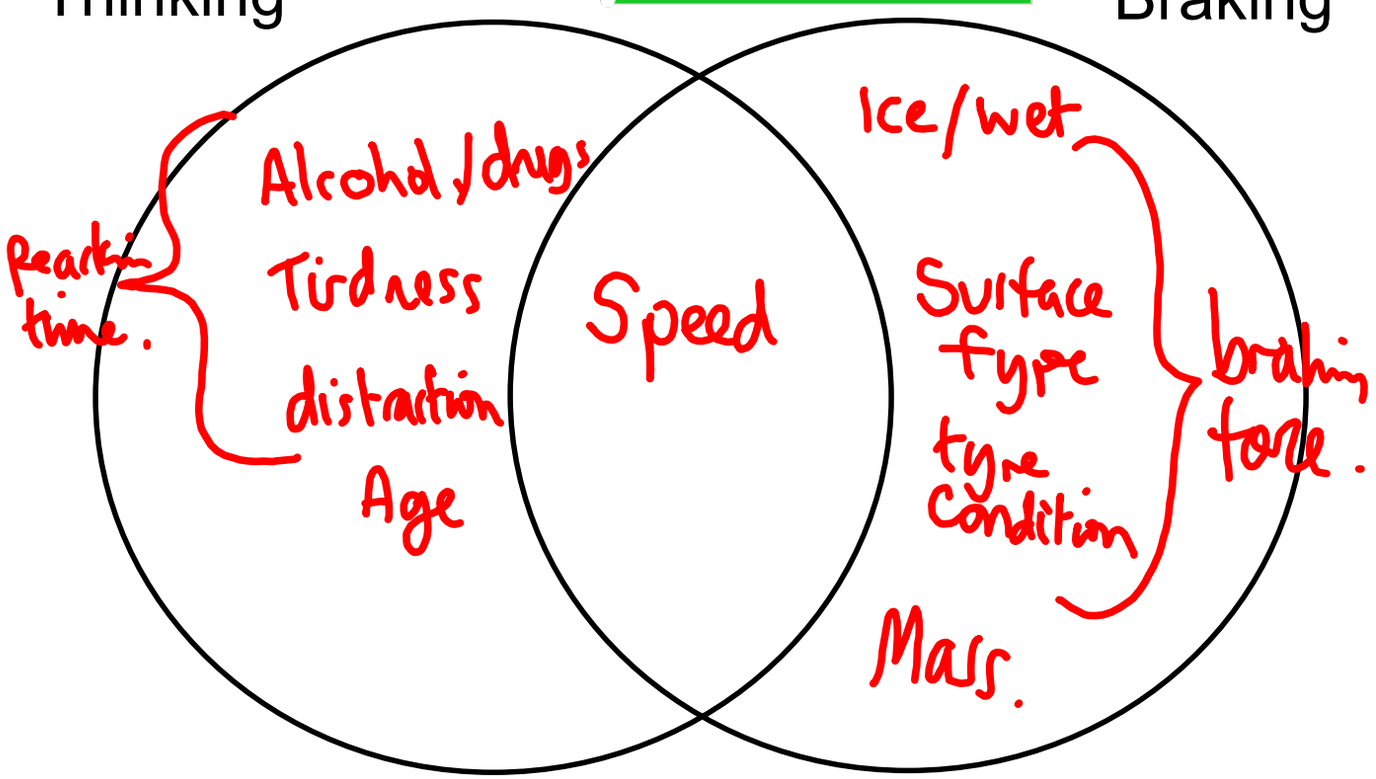
1. What is the difference between stopping distance. braking distance and thinking distance?
2. What factors affect braking distance? thinking distance? both?

Components of stopping distances

The **stopping distance** is the total distance travelled from when the driver first sees a reason to stop, to when the vehicle stops. It has two components:

- **thinking distance**, the distance travelled between the moment when you first see a reason to stop, to the moment when you use the brake
- **braking distance**, the distance travelled from the time the brake is applied until the vehicle stop





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1. Q3-5

Summary questions

1 The reaction time of a tired driver is 1.5 s. The speed of the car is 22 m s^{-1}. The braking distance of the car is 38 m. Calculate the stopping distance of the car. *(3 marks)*

2 According to a student, thinking distance is directly proportional to the speed of the car. Show that this is the case. *(2 marks)*

3 Use Table 1 to answer this question. A car is travelling at 70 mph (31.1 m s^{-1}) on the motorway when it has to stop for an emergency. Calculate:

a the deceleration of the car when travelling at this speed; *(4 marks)*

b the time taken for the car to stop when the brakes are applied. *(3 marks)*

4 The velocity–time graph in Figure 3 shows the motion of a car from the instant the driver sees a hazard on the road.

Calculate the thinking, braking, and stopping distances. Explain your answer. *(3 marks)*

5 According to a student, braking distance is directly proportional to the $(\text{speed})^2$. Show that this is the case. *(3 marks)*

(6) M - Define thinking braking and stopping distance
(7) S - Explain factors that affect these distances
(8) C - Apply SUVAT to problems involving braking distance

Plenary

16 Fig.16 shows typical thinking, braking and stopping distances for **cars** driven at different initial speeds. The speed is shown in miles per hour (mph).

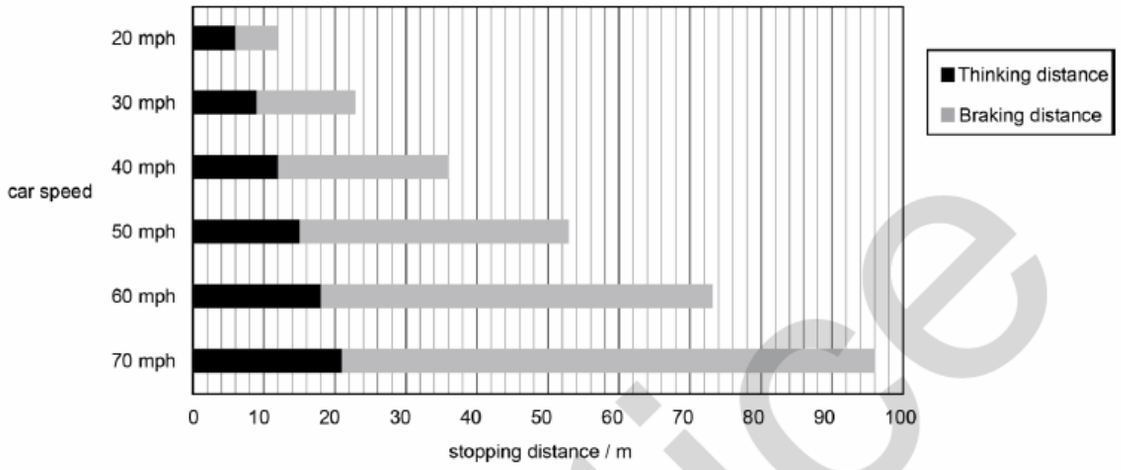

Fig. 16

(a) State what is meant by *thinking distance* and state how it varies with initial speed of a car.

.....

(b) A **truck** of mass 2300 kg is travelling at a constant speed of 22 m s^{-1} along a dry, level road. The driver reacts to a hazard ahead and applies the brakes to stop the truck. The reaction time of the driver is 0.97 s. The brakes exert a constant braking force of 8700 N.

(i) Calculate the magnitude of the deceleration of the truck when braking.

deceleration = ...m s^{-2} **[2]**